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EXAMINER

CASTRO, ANGEL A

ART UNIT PAPER NUMBER

2653

DATE MAILED: 07/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/676,216

Applicant(s)

PAN ET AL.

Examiner

Angel A Castro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 23 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 25 and 26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24, 27-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 14.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/23/04 has been entered.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 14-15 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Larson et al (U.S. Pat. 6,151,197) in view of Bennin et al (U.S. Pat. 5,982,584).

Regarding claims 1 and 24, Larson et al discloses an integrated lead suspension assembly for supporting a slider in a magnetic storage system (figures 3-4 and 6), comprising:

a load beam 301, the load beam having a longitudinal, generally flat structure;

a limiter 360 having a free end extending from a fixed end from the load beam, the limiter is bendable from a first position in which the free end is substantially in a plane of the

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load beam, to a second position in which the free end is substantially out of the plane of the load beam; and

a flexure assembly 354 comprising a longitudinal, generally flat flexible member, a first section of the flexible member being fixedly attached to the load beam, and a second section of the flexible member defining a slider mounting section (figure 4) for supporting a slider 400 and an aperture (shown in figure 6, but not labeled) that is sized and positioned with respect to the limiter to provide a clearance allowing the limiter to freely move through the aperture such that the limiter is free to be bent from the first position to the second position and extend through the aperture after the flexure assembly has been attached to the load beam, wherein

the slider mounting section extends into the aperture, having an end that interacts with the limiter in its second position.

Larson et al further discloses a motor 15 (figure 1), a control unit 21 (figure 2) for controlling the operations of the motor and actuator assembly and processing data read from and written to the data surface.

Larson et al also discloses that the load beam has a tip region at a distal end of the load beam (figure 6), and comprises a tab 304 extending from the distal end of the load beam, wherein the tab has a curve surface (column 5, lines 39-42) for interacting with an external cam surface 110 for slider loading and unloading with respect to a parked position.

Regarding claim 15, Larson et al shows that the second section of the flexible member extends over a tip region of the load beam, wherein the tip region is substantially same or narrower than the slider mounting section (see figure 6).

With regard to claims 1, 14-15 and 24, Bennin shows an integrated lead suspension (figures 3-7) where conductive leads 46 are formed on a flexible member 24.

Although most suspensions have conductive leads, Larson et al does not specifically show the conductive leads formed on the flexible member. Assuming *arguendo* that Larson did not show the conductive leads formed on the flexure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the suspension assembly of Larson with the conductive leads formed on the flexure in view of the teachings of Bennin.

The rationale is as follows: One of ordinary skill in the art would have been motivated to provide the suspension assembly of Larson et al with the conductive leads formed on the flexure as taught by Bennin as it would spare the need to string separate wires, thus providing a lighter and thinner suspension.

4. Claims 2-8 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Larson et al in view of Bennin et al as applied to claim 1 above, and further in view of Takagi et al (U.S. Pat. 6,388,843).

Regarding claims 2-8 and 27, Larson et al in view of Bennin et al discloses the integrated lead suspension described above.

Regarding claims 2 and 27, Larson shows the free end of the limiter extends towards the second section of the flexible member.

Regarding claim 3, Larson shows that the aperture is located in the second section of the flexible member between the first section and the slider mounting section (see figure 6).

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Regarding claim 4, Larson shows that the aperture is located in the second section of the flexible member at a leading edge side of a slider to be placed into operation (see figures 3B and 6).

Regarding claims 5-7, Larson discloses that the flexible member defines a stop 358 that interacts with the limiter 360 in its second position such that movement of the flexible member away from the load beam is limited by catching the limiter by the stop (column 7, lines 16-24) and that the flexible member is substantially free of permanent bending in its substantially flat structure (see figure 5).

Regarding claim 8, Larson shows a pivoting means 356 for pivoting gimbal motion of the slider mounting section, wherein the aperture in the flexible member is between the pivoting means and the first section of the flexible member (see figures 3-4 and 6).

Regarding claims 2-8 and 27, Larson et al in view of Bennin does not show the free end of the limiter extending toward the first section of the flexible member and that the stop comprises a hook member.

Regarding claims 2-8 and 27, Takagi et al shows a suspension for a disc drive (figures 1-3, 10) where the free end 54 of the limiter 50 (or 74 in figure 10) extends towards the first section of the flexible member 22 (the part attached to the load beam 21) where the stop comprises a hook member 21b (figure 10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the lead suspension assembly of Larson in view of Bennin with the limiter in the opposite direction (with the free end of the limiter extending toward the first section of the flexible member) and the stop in the form of a hook as taught by Takagi, and since it has

been held that a mere reversal of the essential working parts of a device involves only routine skill in the art. *In re Einstein*, 8 USPQ 167 (CCPA 1931).

The rationale is as follows: One of ordinary skill in the art would have been motivated to the lead suspension assembly of Larson in the opposite direction (with the free end of the limiter extending toward the first section of the flexible member) as taught by Takagi as it would produce an even higher vertical stiffness in a short vertical lift (column 7, lines 21-29).

5. Claims 9-13, 21-23 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Larson et al in view of Bennin et al as applied to claim 1 above, and further in view of Simmons et al (U.S. Pat. 5,986,853).

Regarding claims 9-13 and 28, Larson et al in view of Bennin et al discloses the integrated lead suspension described above. Larson in view of Bennin does not show that:

the terminal pads of the conductive leads are not supported by the flexible member (claim 9),

the terminal pads of the conductive leads are located over the openings of the flexible member (claim 10),

the insulation layer extends below the terminal pads but cover an area smaller than the terminal pads and does not extend to the edges of the terminal pads (claims 11-12),

Regarding claims 13 and 28, as the claims are directed to an integrated lead suspension, per se, the method limitations appearing in line 2 of claim 13 and line 10 of claim 28 have only been accorded weight to the extent that they affects the structure of the completed integrated lead suspension. Note that "determination of patentability in 'product-by-process' claims is based on product itself, even though such claims are limited and defined by process [i.e.,

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"solder ball bonding"], and thus product in such claim is unpatentable if it is the same as, or obvious form, product of prior art, even if prior product was made by a different process", *In re Thorpe*, et al., 227 USPQ 964 (CAFC 1985). Furthermore, note that a "product-by-process claim, although reciting subject matter of claim in terms of how it is made [i.e., "solder ball bonding"] is still product claim; it is patentability of product claimed and not recited process steps that must be established, in spite of fact that claim may recite only process limitations", *In re Hirao and Sato*, 190 USPQ 685 (CCPA 1976).

Regarding claims 9-13 and 28, Simmons et al shows an integrated lead suspension comprising stacked conductive leads (figures 3-4, 7 and 11-16) that separate at the head termination pads, where the terminal pads of the conductive leads 302, 304, 306, 308, are not supported by the flexible member 220, 222 (figure 4e) and located over the openings 234 in order to bend as they approach the head termination pads (figures 4e and 7), the insulation layer 156 extends below the terminal pads but cover an area smaller than the terminal pads and does not extend to the edges of the terminal pads (figures 4c and 4d).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the integrated lead suspension of Larson et al in view of Bennin with the terminal pads of the conductive leads not supported by the flexible member and located over the openings and the insulation layer covering an area smaller than the terminal pads as taught by Simmons et al.

The rationale is as follows: Simmons et al use of stacked conductive leads produce noise cancellation and a reduction in size of the suspension. One of ordinary skill in the art would have been motivated to provide the integrated lead suspension of Larson et al in view of

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Bennin with the integrated lead suspension and stacked conductive leads of Simmons as it would allow a reduction in size of the suspension thus of the disk drive.

Regarding claims 21-23, Larson in view of Bennin discloses a load beam with a hinge region (Larson in figure 3A and Bennin in figure 3), conductive leads 46 for reading and writing to and from the slider, and the first section of the flexible member has a split section 32 (see Bennin, figure 3) above the hinge region, wherein the overall perimeter of the split section is generally symmetrical with respect to a longitudinal axis (see Bennin, figure 3). Larson in view of Bennin does not specifically disclose that the flexible member has a split section above the hinge region, supporting read leads on a first branch and write leads on a second branch, wherein the read leads are wider than the write leads and the first branch is wider than the second branch.

Simmons et al discloses that the conductive leads 120 (figures 4c and 11-16) that includes read leads for read data and write leads for write data to and from the slider, and the first section of the flexible member has a split section 202 above the hinge region, supporting read leads on a first branch and write leads on a second branch of a different width (see figure 12, column 6, lines 27-31).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the integrated lead suspension of Larson in view of Bennin with the first section of the flexible member having a split section above the hinge region, supporting read leads on a first branch and write leads on a second branch of a different width as taught by Simmons.

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The rationale is as follows: It is well known in the art that it is desirable to widen the conductors for high frequency signals and to separate the conductive leads to avoid the cross coupling between them. One of ordinary skill in the art would have been motivated to provide the integrated lead suspension of Larson in view of Bennin with the first section of the flexible member having a split section above the hinge region, supporting read leads on a first branch and write leads on a second branch of a different width as taught by Simmons, as it would reduce the cross coupling between the read and write conductive leads while allowing high frequency signals.

6. Claims 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Larson et al in view of Bennin et al as applied to claim 1, and further in view of Supramaniam et al (U.S. Pat. 6,014,290).

Regarding claims 16-18, Larson et al in view of Bennin discloses the integrated lead suspension described above, including a low profile flanges 352 (see Larson, figures 3B and 5).

Larson in view of Bennin does not specifically disclose the claimed angle ranges of the flanges.

Supramaniam et al discloses an integrated lead suspension (figures 1-8), including flanges with an angle within the claimed range (figures 7-8). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the integrated lead suspension of Larson in view of Bennin with the claimed angles as taught by Supramaniam et al. Assuming *arguendo* that Supramaniam et al did not show the claimed angle range, it would

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have been obvious to a person having ordinary skill in the art modify the angle of the flanges during the course of routine optimization/experimentation.

The rationale is as follows: One of ordinary skill in the art would have been motivated to provide the integrated lead suspension of Larson et al in view of Bennin with the claimed angle range since such ranges, absent any criticality (i.e., unobvious and/or unexpected result(s)), are generally achievable through routine optimization/experimentation, and since discovering the optimum or workable ranges, where the general conditions of a claim are disclosed in the prior art, involves only routine skill in the art, *In re Aller*, 105 USPQ 233 (CCPA 1955). Moreover, in the absence of any criticality (i.e., unobvious and/or unexpected result(s)), the parameters set forth above would have been obvious to a person having ordinary skill in the art at the time the invention was made, *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Regarding claims 19-20, Larson et al in view of Bennin et al discloses an integrated lead suspension assembly described above. Larson et al in view of Bennin does not specifically disclose at least a dimple protrusion near an edge of the load beam, on a same side as the flexure assembly and at a location where the load beam is not attached to or facing the flexible member. Supramaniam et al discloses an integrated lead suspension assembly (figures 5-6 and 12) comprising at least dimple protrusion 34, 36 (it is noted that the dimple shown in figures 1-2, can be used here as pointed out in column 6, lines 50-55), near an edge of the load beam, on a same side as the flexure assembly 91 and at a location where the load beam is not attached to or facing the flexible member. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the integrated lead suspension assembly of Larson

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in view of Bennin with the dimple protrusions on the load beam as taught by Supramaniam et al.

The rationale is as follows: Supramaniam et al provide dimples to protect the conductors on the flexure from contact with the lifting arm of a shipping comb. One of ordinary skill in the art would have been motivated to provide the load beam of an integrated lead suspension assembly with the dimples on the load beam in order to protect the integrated lead suspension assembly from being damaged during shipping from one location to another.

*Response to Arguments*

7. Applicant's arguments filed 4/23/04 have been fully considered but they are not persuasive.

Applicant asserts in page 16, lines 4-10:

“In contradistinction, referring to Fig. 6 in Larson, Larson discloses the deployment of limiters 360 that act on the tabs 358 on the sides of the flexures 354, on either side of the slider 400. The mounting section of the slider 400 does not have any end that interacts with any limiter. Instead, the tabs 358 are found on the side rails of the ring-shaped flexure that surrounds the slider mounting section, not on the slider mounting section. Referring also to Fig. 3B in Larson, it is clear that the tabs 358 are not connected to the ends of the slider mounting section, which is found below the slider 400 (obscured from view in Fig. 3B).”

The examiner respectfully points out that “a second section of the flexible member defining a slider mounting section for supporting slider” is shown in figure 6 of Larson where the slider 400 is mounted on a frame that is part of the flexible member 412 and comprises the tabs 358, the tabs interacting with the limiter 360.

7. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Danielson et al (U.S. Pat. 6,667,856) discloses a head suspension with integral shock limiter; Takagi et al (JP 2000195209) discloses a suspension for disk device; Maaku (JP 10055636) discloses a suspension assembly.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Angel A Castro whose telephone number is 703-308-8435. The examiner can normally be reached on Monday through Thursday, 8 AM to 6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William R Korzuch can be reached on 703-305-6137. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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A handwritten signature in black ink, appearing to read "Angel Castro C".

Angel Castro, Ph.D.